

Appl. No.10/816,302

Amdt. dated December 23rd, 2005

Reply to Office Action of 26 Nov 2005

Complete listing of pending claims, as amended:

7. A motor positioning servo loop comprising:

a microcontroller device;

a digital to analog converter, having a digital input and an analog output,
said digital input receiving digital signal from said microcontroller
device and said analog output coupled to a motor actuator;

a motor coupled to said motor actuator;

a detecting device, having a digital output, said digital output coupled to
said microcontroller;

wherein said detecting device detects a physical parameter comprising
at least one member of the group consisting of position, velocity
and acceleration;

wherein said motor actuator receives an analog signal from said digital
to analog converter and delivers electrical energy to said motor;

wherein said digital to analog converter is an oversampling digital to
analog converter, comprising a digital oversampling modulator,
whose output signal is a bitstream analog signal, and

whereby said microcontroller receives a commanding digital signal from
a commanding source and a feedback digital signal from said
digital output of said detecting device and processes the digital data
to drive said motor actuator in response to said commanding digital
signal and said feedback digital signal to control said physical
parameter.

**8. The motor positioning servo loop of claim 7 wherein said motor is a Hard
Disk Drive voice coil motor (VCM).**

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9. The motor positioning servo loop of claim 7 wherein said motor actuator is an optical data storage device actuator.
10. The motor positioning servo loop of claim 7 wherein said oversampling digital to analog converter is a sigma-delta bitstream digital to analog converter.
11. The motor positioning servo loop of claim 7 wherein said digital oversampling modulator of said oversampling digital to analog converter is implemented in hardware within said microcontroller.
12. The motor positioning servo loop of claim 7 wherein said digital oversampling modulator of said oversampling digital to analog converter is implemented in software within said microcontroller.
13. A method for achieving accurate control of the physical parameters of a system, by means of a motor positioning servo loop comprising:
 - measuring the value of said physical parameters of said system;
 - generating a motor control servo signal responsive to the difference between said value of said physical parameters of said system and a desired value;
 - generating an oversampled bitstream analog signal responsive to said motor control servo signal;
 - controlling said system by means of driving a motor in response to said oversampled bitstream analog signal;
 - wherein said physical parameters are at least one member of the group consisting of position, velocity, acceleration, and pressure; and
 - whereby the resolution and dynamic range of said motor positioning servo loop is increased by means of noise shaping of said oversampled bitstream analog signal.

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14. The method of claim 13 wherein said system is a Hard Disk Drive data read and write head positioning system.
15. The method of claim 13 wherein said system is an optical data storage data read and write head positioning system.
16. The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a sigma-delta bitstream digital to analog modulator.
17. The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a digital oversampling modulator implemented in hardware within a microcontroller.
18. The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a digital oversampling modulator implemented in software within a microcontroller.

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Complete listing of claims, as amended:

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
7. (amended) A motor positioning servo loop comprising:
 - a microcontroller device;
 - a digital to analog converter, having a digital input and an analog output,
said digital input receiving digital signal from said microcontroller
device and said analog output coupled to a motor actuator;
 - a motor coupled to said motor actuator;
 - a detecting device, having a digital output, said digital output coupled to
said microcontroller;
 - wherein said detecting device detects a physical parameter comprising
at least one member of the group consisting of position, velocity
and acceleration;
 - wherein said motor actuator receives an analog signal from said digital
to analog converter and delivers electrical energy to said motor;
 - wherein said digital to analog converter is an oversampling digital to
analog converter, comprising a digital oversampling modulator,
whose output signal is a bitstream analog signal, and

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whereby said microcontroller receives a commanding digital signal from a commanding source and a feedback digital signal from said digital output of said digital output of said detecting device and processes the digital data to drive said motor actuator in response to said commanding digital signal and said feedback digital signal to control said physical parameter.

8. (pending) The motor positioning servo loop of claim 7 wherein said motor is a Hard Disk Drive voice coil motor (VCM).
9. (pending) The motor positioning servo loop of claim 7 wherein said motor actuator is an optical data storage device actuator.
10. (pending) The motor positioning servo loop of claim 7 wherein said oversampling digital to analog converter is a sigma-delta bitstream digital to analog converter.
11. (pending) The motor positioning servo loop of claim 7 wherein said digital oversampling modulator of said oversampling digital to analog converter is implemented in hardware within said microcontroller.
12. (pending) The motor positioning servo loop of claim 7 wherein said digital oversampling modulator of said oversampling digital to analog converter is implemented in software within said microcontroller.
13. (amended) A method for achieving accurate control of the physical parameters of a system, by means of a motor positioning servo loop comprising:
 - measuring the value of said physical parameters of said system;
 - generating a motor control servo signal responsive to the difference between said value of said physical parameters of said system and a desired value;
 - generating an oversampled bitstream analog signal responsive to said motor control servo signal;

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controlling said system by means of driving a motor in response to said oversampled bitstream analog signal;

wherein said physical parameters are at least one member of the group consisting of position, velocity, acceleration, and pressure[, temperature and illumination]; and

whereby the [noise] resolution and dynamic range of said motor positioning servo loop is [reduced] increased by means of noise shaping of said oversampled bitstream analog signal.

14. (pending) The method of claim 13 wherein said system is a Hard Disk Drive data read and write head positioning system.
15. (pending) The method of claim 13 wherein said system is an optical data storage data read and write head positioning system.
16. (pending) The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a sigma-delta bitstream digital to analog modulator.
17. (pending) The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a digital oversampling modulator implemented in hardware within a microcontroller.
18. (pending) The method of claim 13 wherein said oversampled bitstream analog signal is generated by means of a digital oversampling modulator implemented in software within a microcontroller.